



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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Eric J. Holcomb
Governor

Brian C. Rockensuess
Commissioner

XXX, 2022

Ms. Debra Shore
Regional Administrator
U.S. EPA, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3950

Re: 2022 Assessment for Ongoing Data
Requirements for the 2010 Primary 1-Hour
Sulfur Dioxide National Ambient Air Quality
Standard

Dear Ms. Shore:

The Indiana Department of Environmental Management (IDEM) has completed a review of areas subject to ongoing data requirements, as well as a Round 1 maintenance area, under the 2010 primary 1-hour sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS). Based on the evaluation, IDEM recommends that no additional assessments to characterize air quality are needed at this time.

In addition, Indiana is requesting the removal of Floyd County, a Round 3 area, from future annual ongoing data requirements assessments due to the permanent closure and dismantling of the Duke Energy - Gallagher Station.

Background

Implementation of the 2010 primary 1-hour SO₂ standard began in 2013 when United States Environmental Protection Agency (U.S. EPA) established nonattainment areas near monitors with data greater than the SO₂ NAAQS. These Round 1 areas were subsequently designated attainment and are not subject to ongoing data requirements. The Southwest Indiana, IN, maintenance area was part of Round 1 and is included in this analysis to address continuing contingency plan triggers due to the discontinuation of all SO₂ monitors in the maintenance area. To evaluate the remaining areas of the country, U.S. EPA established three additional rounds of designations: Round 2 on June 30, 2016, Round 3 on December 21, 2017, and Round 4 on December 21, 2020. This evaluation, per 40 Code of Federal Regulations (CFR) Subpart BB §51.1205(a) and (b), addresses areas designated during Round 2, Round 3, and Round 4.

For these designated areas, ongoing data requirements are applicable if SO₂ monitoring or modeling using actual emissions was used as the basis for demonstrating attainment of the NAAQS during the designations process. For areas that used monitoring, ongoing requirements are the continued operation of the SO₂ monitoring network and the reporting of such data. For areas that used modeling, ongoing requirements are the assessment of annual SO₂ emissions and a recommendation regarding whether additional modeling is needed to characterize air quality to determine whether the area continues to meet the SO₂ NAAQS. However, per §51.1205(b)(2), if modeling demonstrates that air quality values at all receptors in the analysis area are no greater than 50% of the standard, and such demonstration is approved by the U.S. EPA Regional Administrator, the ongoing requirements of §51.1205(b) do not apply. Ongoing data requirements are also not applicable to sources that relied on federally enforceable and permanent SO₂ emission limits as the basis for establishing designations demonstrating that the area will not violate the 2010 SO₂ NAAQS.

For areas where modeling shows ambient impacts greater than 50% of the standard, U.S. EPA generally recommends updated modeling under the following circumstances:

- The original modeling was between 50% and 90% of the standard (98.1 – 176.58 µg/m³) and emissions increase by 15% or more.
- The original modeling was equal to or greater than 90% of the standard (176.58 µg/m³) and there is any increase in emissions.

Round 1 Area

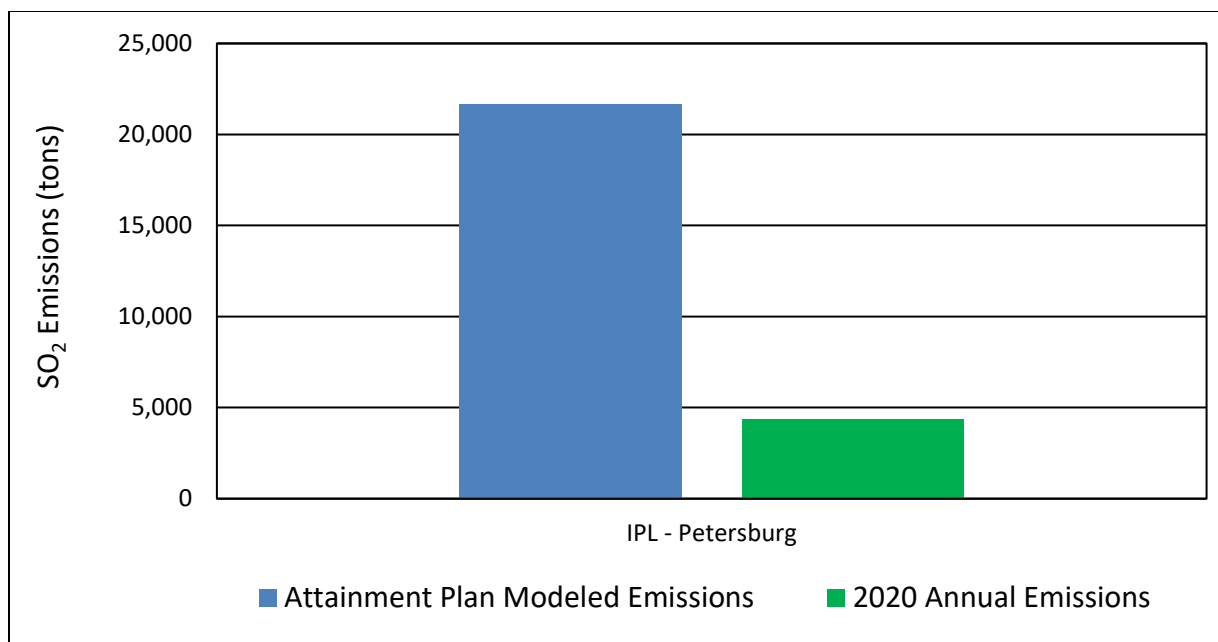
Southwest Indiana, IN, Maintenance Area – Partial Daviess County and Partial Pike County (IPL – Petersburg Generating Station)

SO₂ concentrations in the Southwest Indiana, IN maintenance area have been well below the SO₂ NAAQS since 2016. As such, at the end of 2020, all SO₂ ambient air quality monitors in the maintenance area ceased operation. To verify continued attainment with the NAAQS and determine whether additional studies are needed, Indiana will continue to monitor contingency plan triggers by comparing the annual tons per year SO₂ emissions from the IPL – Petersburg Generating Station to modeled emission limits (i.e., equivalent 21,661 tons per year) used in the 1-hour SO₂ attainment demonstration. The modeling was based on never-to-exceed maximum-allowable rates that provide an ample margin of safety and are protective of the NAAQS. The analysis for the Southwest Indiana, IN, maintenance area is documented in Table 1 and Chart 1.

Table 1: SO₂ Emissions (tons) for the Southwest Indiana, IN Maintenance Area

Source Name	Attainment Plan Modeled Emissions	2020	Change	Percent Change
IPL – Petersburg	21,661	4,439	-17,222	-79%

Chart 1: SO₂ Emissions for the Southwest Indiana, IN Maintenance Area



As outlined in Chart 1, IPL – Petersburg’s 2020 annual SO₂ emissions are approximately 79% lower than the modeled emission limits. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in the Southwest Indiana, IN maintenance area. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as attainment/unclassifiable” and no changes to its classification are necessary at this time.

Round 2 Areas

During Round 2 designations, five coal-fired electric power plants in Indiana were identified, shown in Table 2, around which air quality characterization was required.

Table 2: Facilities Subject to the Round 2 Designation Process

County	Source
Spencer	American Electric Power (AEP) – Rockport Station
La Porte	Northern Indiana Public Service Company (NIPSCO) – Michigan City Station
Posey	Vectren – A.B. Brown Station
Jefferson	Indiana-Kentucky Electric Corporation (IKEC) – Clifty Creek Station
Gibson	Duke Energy – Gibson Station

On June 30, 2016, U.S. EPA completed designations for Round 2 designating the areas surrounding Indiana's five identified sources as "attainment/unclassifiable". The final rule was published in the Federal Register (FR) on July 12, 2016 (81 FR 45039). The applicability of ongoing requirements for Round 2 areas is shown in Table 3.

Table 3: Ongoing Data Requirements Applicability for Round 2 Areas

Area	Source(s)	Modeled Impact $\mu\text{g}/\text{m}^3$	Greater Than 50% NAAQS?	Ongoing Data Requirements Applicability?
Spencer	AEP – Rockport Station	152.1	Yes	Yes
La Porte	NIPSCO – Michigan City Station	169.9	Yes	Yes
Posey	Vectren – A.B. Brown Station	196.08	Yes	No (Emission limits used for designation.)
Jefferson	IKEC – Clifty Creek Station	71.6	No	No (Emission limits used for designation.)
Gibson	Duke Energy – Gibson Station	NA (Monitoring used for designation.)		Yes

As shown in Table 3, ongoing data requirements are applicable to only three of the five Round 2 areas. Each area is discussed below.

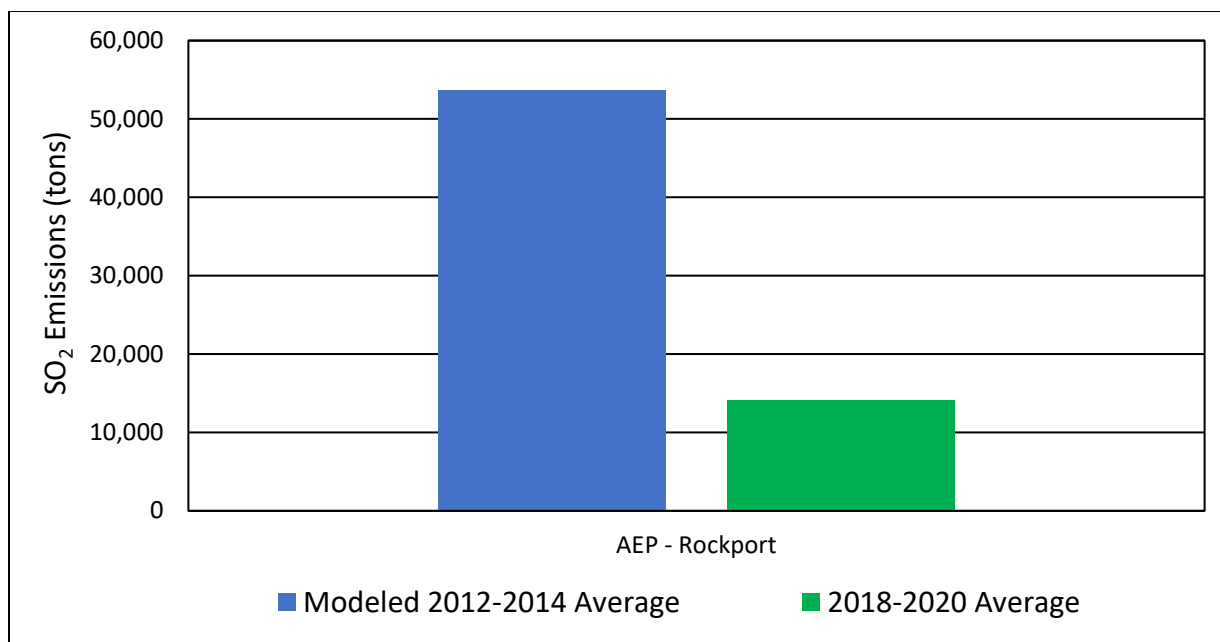
Spencer County (AEP - Rockport Station)

For Spencer County, on September 16, 2015, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values were greater than 50%, but less than 90%, of the 1-hour SO_2 NAAQS. As such, the SO_2 emissions assessment requirement in 40 CFR §51.1205(b) is applicable and an emissions increase greater than 15% may necessitate additional modeling analyses to characterize air quality in the area. The primary source associated with the Spencer County area is AEP's Rockport Station. The analysis for the Spencer County area focused on the most recent three years of data and is documented in Table 4 and Chart 2.

Table 4: SO_2 Emissions (tons) for the Spencer County Area

Source Name	2012	2013	2014	Modeled 2012-2014 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
AEP – Rockport	54,390	51,636	54,979	53,668	21,241	14,342	6,816	14,133	-39,535	-74%

Chart 2: SO₂ Emissions for Spencer County Area



As outlined in Table 4 and Chart 2, averaged SO₂ emissions for 2018-2020 have decreased approximately 74% from the averaged SO₂ emissions for 2012-2014 used in the modeling for designations. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in Spencer County. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as “attainment/unclassifiable” and no changes to its classification are necessary at this time.

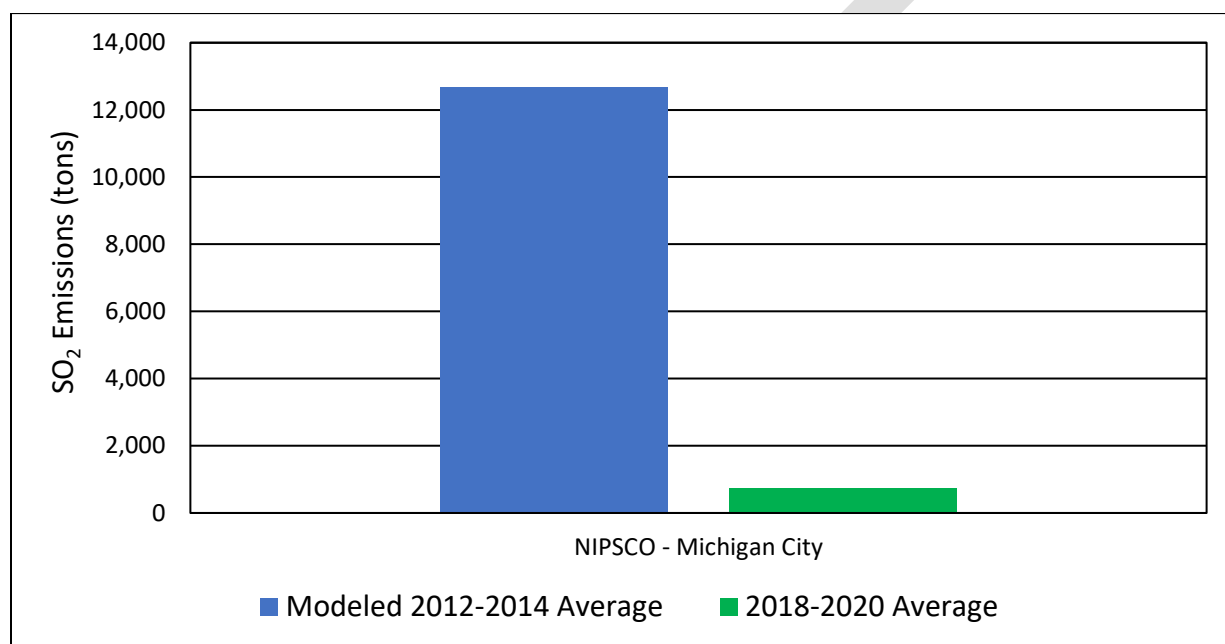
La Porte County (NIPSCO – Michigan City Station)

For La Porte County, on September 16, 2015, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values were greater than 50%, but less than 90%, of the 1-hour SO₂ NAAQS. As such, the SO₂ emissions assessment requirement in 40 CFR §51.1205(b) is applicable and an emissions increase greater than 15% may necessitate additional modeling analyses to characterize air quality in the area. The primary source associated with the La Porte County area is NIPSCO’s Michigan City Station. The analysis for La Porte County focused on the most recent three years of data and is documented in Table 5 and Chart 3.

Table 5: SO₂ Emissions (tons) for the La Porte County Area

Source Name	2012	2013	2014	Modeled 2012-2014 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
NIPSCO – Michigan City	11,584	10,429	15,991	12,668	997	485	695	726	-11,942	-94%

Chart 3: SO₂ Emissions for the La Porte County Area



As outlined in Table 5 and Chart 3, averaged SO₂ emissions for 2018-2020 have decreased approximately 94% from the averaged SO₂ emissions for 2012-2014 used in the modeling for designations. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in La Porte County. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as “attainment/unclassifiable” and no changes to its classification are necessary at this time.

Gibson County (Duke Energy – Gibson Station)

For Gibson County, because monitoring data was used to characterize air quality for Round 2 designations, ongoing data requirements are the continued operation of SO₂ monitors as well as the continued reporting of such data. Duke Energy continues to operate the SO₂ monitoring network and data is reported to U.S. EPA's Air Quality System (AQS) database. It is worth noting that certified ambient air quality monitoring data continues to demonstrate attainment of the 2010 primary 1-hour SO₂ standard as shown in Table 6.

Table 6: Duke Energy's Gibson Generating Station SO₂ Monitoring Data

Site ID	County	99th Percentile Values, ppb						3-Year Design Value, ppb			
		2016	2017	2018	2019	2020	2021	2016-2018	2017-2019	2018-2020	2019-2021
180510002	Gibson	71.0	47.9	49.2	41.3	59.3	37.2	56	46	50	46

Round 3 Areas

During Round 3 designations, eleven sources in Indiana, shown in Table 7, were identified around which SO₂ air quality characterization was required.

Table 7: Sources Subject to the Round 3 Designation Process

County	Source
Floyd	Duke Energy – Gallagher Station
Huntington	U.S. Mineral Products – Isolatek
Jasper	NIPSCO - R.M. Schahfer Station
Lake	Cleveland-Cliffs Steel (316) ¹
Lake	Cokenergy
Lake	U.S. Steel Gary Works
Posey	SABIC – Innovative Plastics
Sullivan	Hoosier Energy – Merom Station
Vermillion	Duke Energy – Cayuga Station
Warrick	ALCOA Warrick Operations
Warrick	ALCOA Power Plant

¹ Formerly known as ArcelorMittal USA.

On December 21, 2017, U.S. EPA completed designations for Round 3 designating areas associated with ten of the eleven identified sources as “attainment/unclassifiable”. One area, Huntington Township, associated with U.S. Mineral Products, in Huntington County, was designated “nonattainment”. The final rule was published in the Federal Register on January 9, 2018 (83 FR 1098). Indiana has filed a petition for reconsideration and request for agency stay pending reconsideration of the final rule designating Huntington Township, Huntington County as nonattainment. The applicability of ongoing requirements for Round 3 areas is shown in Table 8.

Table 8: Ongoing Data Requirements Applicability for Round 3 Areas

Area	Source(s)	Modeled Impact µg/m ³	Greater Than 50% NAAQS?	Ongoing Data Requirements Applicability?
Floyd	Duke Energy – Gallagher Station	99.5	Yes	Yes
Huntington	U.S. Mineral Products – Isolatek	Not Applicable	Not Applicable	Not Applicable
Jasper	NIPSCO – R.M. Schahfer Station	162.7	Yes	Yes
Lake	Cleveland-Cliffs Steel (316) ² Cokenergy U.S. Steel Gary Works	192.2 ¹	Yes	Yes
Posey	SABIC – Innovative Plastics	191.9	Yes	No (Emission limits used for designation.)
Sullivan	Hoosier Energy – Merom Station	63.0	No	No
Vermillion	Duke Energy – Cayuga Station	176.4	Yes	Yes
Warrick	ALCOA Warrick Operations ALCOA Warrick Power Plant	189.7	Yes	Yes

¹ Modeled impact associated with the Carmeuse Lime facility, which accepted permanent and enforceable SO₂ permit limits to demonstrate attainment of the 1-hr NAAQS.

² Formerly known as ArcelorMittal USA.

As shown in Table 8, ongoing data requirements are applicable to only five of the eight Round 3 areas. Each area is discussed below.

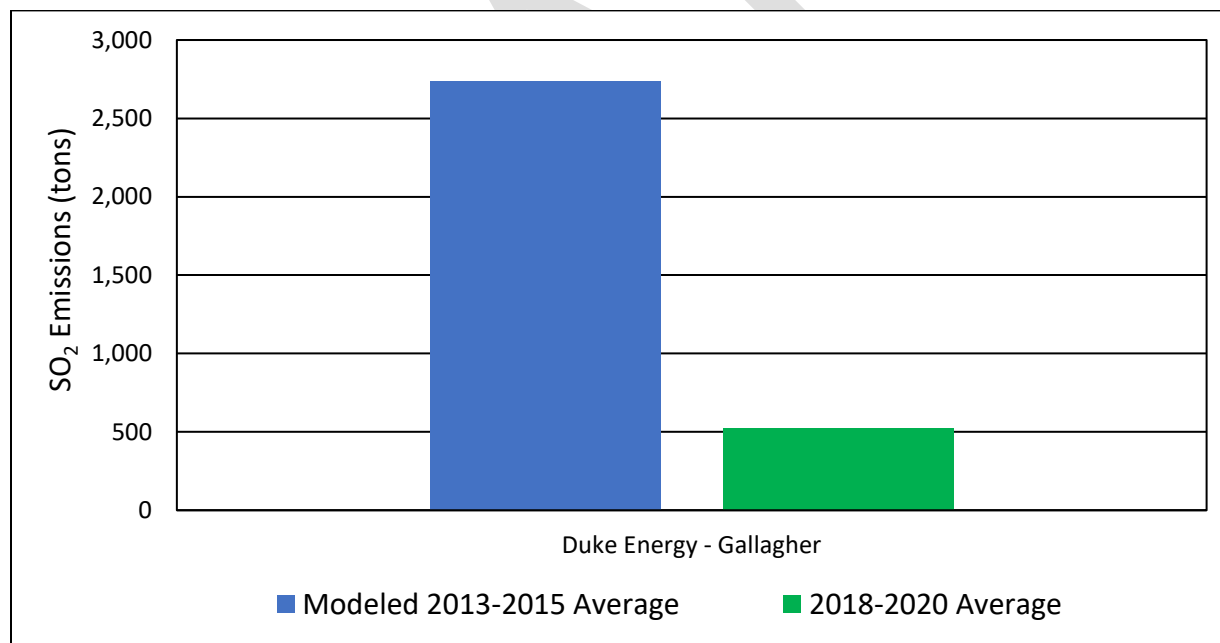
Floyd County (Duke Energy – Gallagher Station)

For Floyd County, on January 13, 2017, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values were greater than 50%, but less than 90%, of the 1-hour SO₂ NAAQS. As such, the SO₂ emissions assessment requirement in 40 CFR §51.1205(b) is applicable and emissions increase greater than 15% may necessitate additional modeling analyses to characterize air quality in the area. The primary source associated with the Floyd County area was Duke Energy's Gallagher Station. The analysis for Floyd County is documented in Table 9 and Chart 4.

Table 9: SO₂ Emissions (tons) for the Floyd County Area

Source Name	2013	2014	2015	Modeled 2013-2015 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
Duke Energy – Gallagher	2,498	3,528	2,178	2,735	1,149	170	246	522	-2,213	-81%

Chart 4: SO₂ Emissions for the Floyd County Area



As outlined in Table 9 and Chart 4, averaged SO₂ emissions for 2018-2020 have decreased by approximately 81% from the averaged SO₂ emissions for 2013-2015 used in the modeling for designations. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in Floyd County. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as “attainment/unclassifiable” and no changes to its classification are necessary at this time. The Gallagher Station permanently closed in June of 2021 and is in the process of being dismantled. As such, Indiana is requesting the removal of the

analysis for the Floyd County area from future annual ongoing data requirements reports.

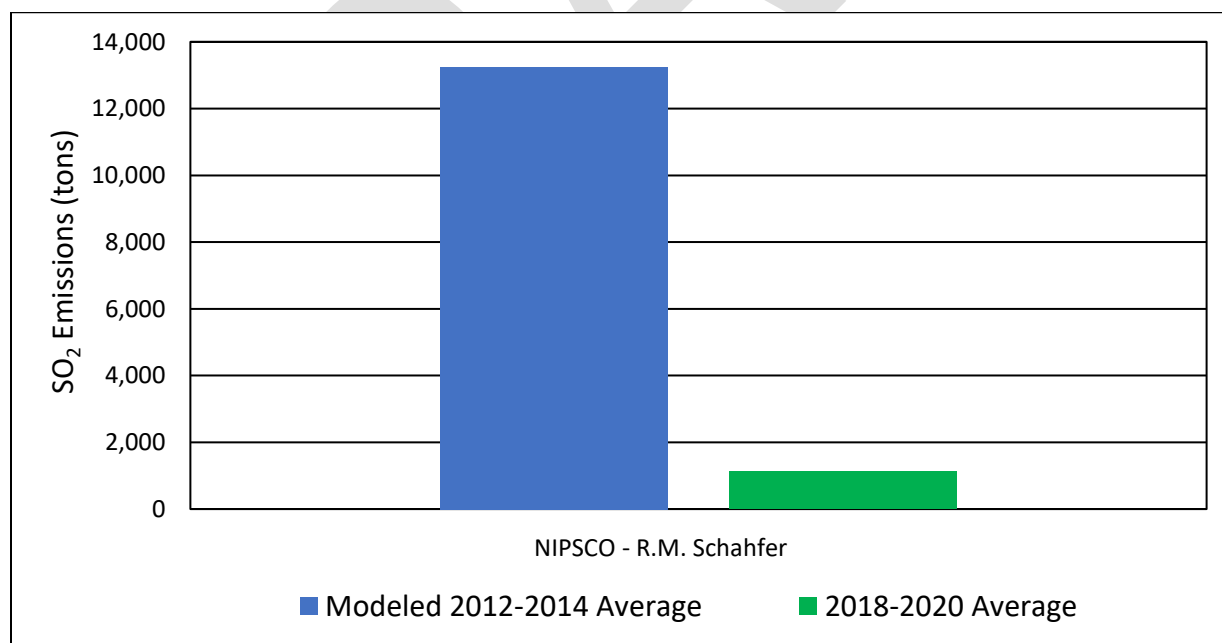
Jasper County (NIPSCO – R.M. Schahfer Station)

For Jasper County, on January 13, 2017, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values were greater than 50%, but less than 90%, of the 1-hour SO₂ NAAQS. As such, the SO₂ emissions assessment requirement in 40 CFR §51.1205(b) is applicable and emissions increase greater than 15% may necessitate additional modeling analyses to characterize air quality in the area. The primary source associated with the Jasper County area is NIPSCO's R.M. Schahfer Station. The analysis for the Jasper County area focused on the most recent three years of data and is documented in Table 10 and Chart 5.

Table 10: SO₂ Emissions (tons) for Jasper County Area

Source Name	2012	2013	2014	Modeled 2012-2014 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
NIPSCO – R.M. Schahfer	14,911	16,418	8,413	13,247	1,467	1,168	760	1,132	-12,115	-91%

Chart 5: SO₂ Emissions for the Jasper County Area



As outlined in Table 10 and Chart 5, averaged SO₂ emissions for 2018-2020 have decreased by approximately 91% from the averaged SO₂ emissions for 2012-2014 used in the modeling for designations. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in Jasper County. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as “attainment/unclassifiable” and no changes to its classification are necessary at this time.

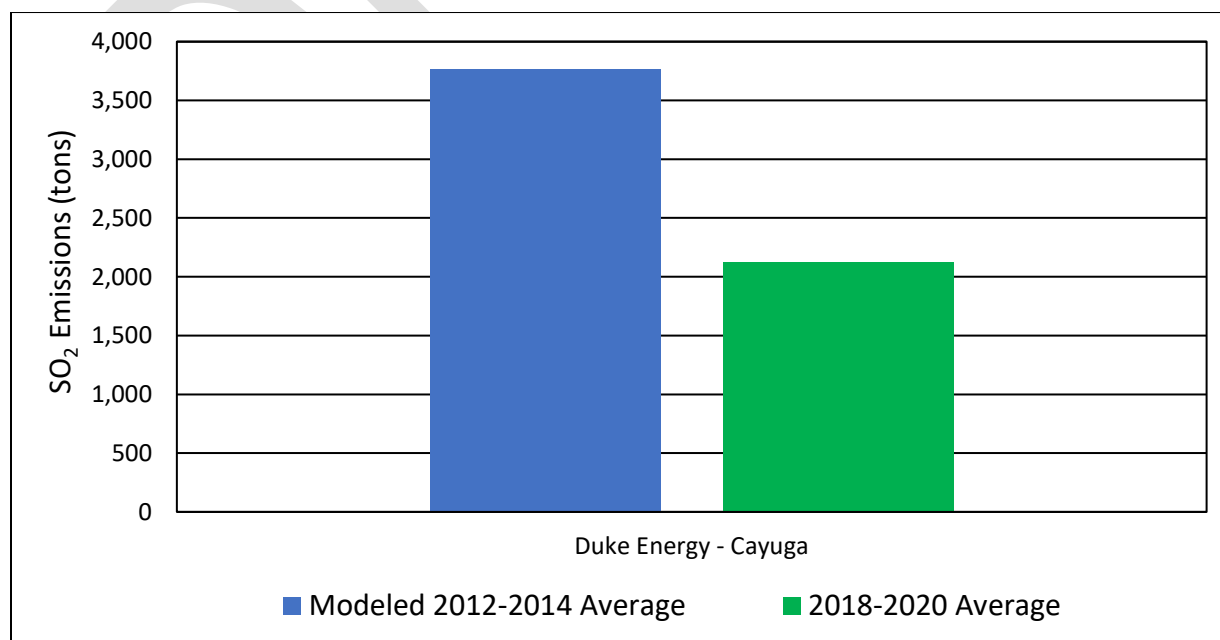
Vermillion County (Duke Energy – Cayuga Station)

For Vermillion County, on January 13, 2017, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values were greater than 50%, but less than 90%, of the 1-hour SO₂ NAAQS. As such, the SO₂ emissions assessment requirement in 40 CFR §51.1205(b) is applicable and emissions increase greater than 15% may necessitate additional modeling analyses to characterize air quality in the area. The primary source associated with the Vermillion County area is Duke Energy’s Cayuga Station. The analysis for the Vermillion County area focused on the most recent three years of data and is documented in Table 11 and Chart 6.

Table 11: SO₂ Emissions (tons) for the Vermillion County Area

Source Name	2012	2013	2014	Modeled 2012-2014 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
Duke Energy – Cayuga	3,223	4,628	3,448	3,766	2,657	1,802	1,902	2,120	-1,646	-44%

Chart 6: SO₂ Emissions for the Vermillion County Area



As outlined in Table 11 and Chart 6, averaged SO₂ emissions for 2018-2020 have decreased approximately 44% from the averaged SO₂ emissions for 2012-2014 used in the modeling for designations. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in Vermillion County. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as “attainment/unclassifiable” and no changes to its classification are necessary at this time.

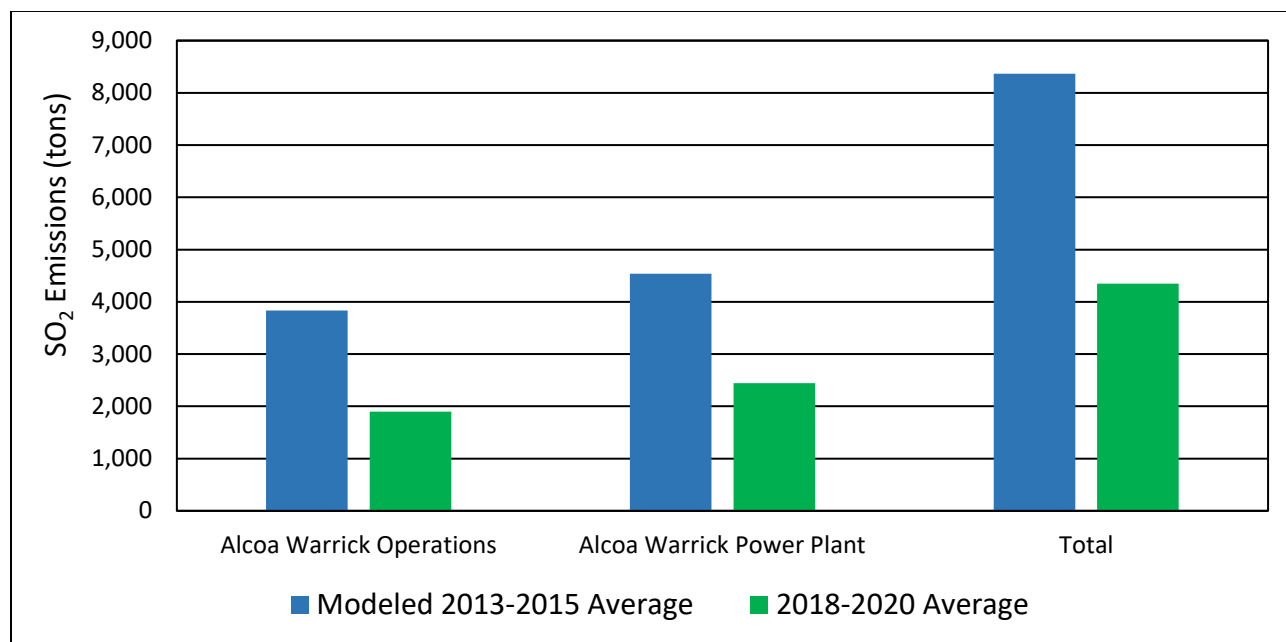
Warrick County (ALCOA Warrick Operations, ALCOA Warrick Power Plant)

For Warrick County, on October 18, 2017, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values greater than 90% of the 1-hour SO₂ NAAQS. As such, the SO₂ emissions assessment requirement in 40 CFR §51.1205(b) is applicable and any emissions increase may necessitate additional modeling analyses to characterize air quality in the area. The primary sources associated with the Warrick County area are ALCOA Warrick Operations and ALCOA Warrick Power Plant. The analysis for Warrick County focused on the most recent three years of data and is documented in Table 12 and Chart 7.

Table 12: SO₂ Emissions (tons) for Round 3 Sources in Warrick County

Source Name	2013	2014	2015	Modeled 2013-2015 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
ALCOA Warrick Operations	3,852	3,500	4,147	3,833	1,397	2,088	2,219	1,901	-1,932	-50%
ALCOA Warrick Power Plant	5,707	4,993	2,907	4,536	2,927	2,203	2,203	2,444	-2,092	-46%
Total	9,559	8,493	7,054	8,369	4,324	4,291	4,422	4,346	-4,023	-48%

Chart 7: SO₂ Emissions for the Warrick County Area



As outlined in Table 12 and Chart 7, averaged SO₂ emissions for 2018-2020 have decreased approximately 50% and 46% for ALCOA Warrick Operations and ALCOA Warrick Power Plant, respectively, from the averaged SO₂ emissions for 2013-2015 used in the modeling for designations. Based on this SO₂ emissions assessment, Indiana recommends no additional modeling is needed to further characterize air quality in Warrick County. SO₂ emissions have trended downward from what was modeled to demonstrate attainment of the 2010 primary 1-hour SO₂ NAAQS. The area is currently designated as “attainment/unclassifiable” and no changes to its classification is necessary at this time.

Lake County (Cleveland-Cliffs Steel (316), Cokenergy, U.S. Steel Gary Works)

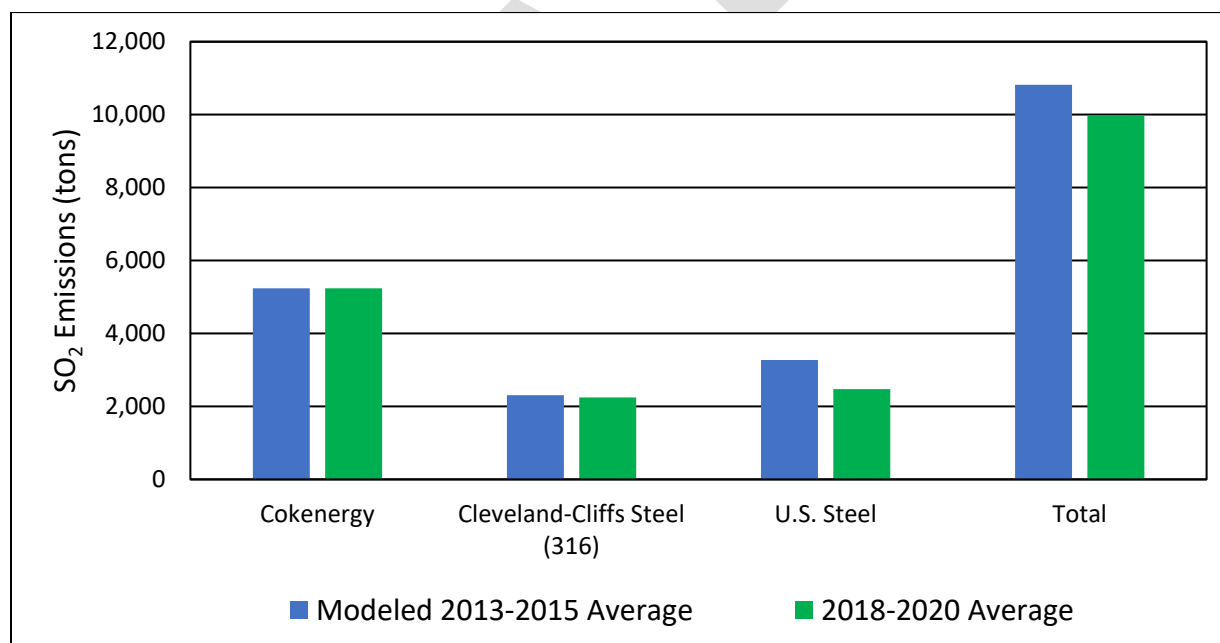
For Lake County, on January 13, 2017, Indiana submitted air quality modeling to U.S. EPA that demonstrated air quality values greater than 90% of the 1-hour SO₂ NAAQS. As such, the SO₂ emissions assessment requirement in 40 CFR §51.1205(b) is applicable and any emissions increase may necessitate additional modeling analyses to characterize air quality in the area. The emissions analysis for Lake County focused on the most recent three years of data, Tables 13, 14, and Chart 8, and is discussed below.

Table 13: SO₂ Emissions (tons) for Round 3 Sources in Lake County

Source Name	2013	2014	2015	Modeled 2013-2015 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
Cokenergy	4,653	4,952	6,104	5,236	5,398	4,840	5,470	5,236	0	0%
Cleveland-Cliffs Steel (316) ¹	2,369	2,163	2,398	2,310	2,249	2,062	2,435	2,249	-61	-3%
U.S. Steel Gary Works	3,564	3,285	2,980	3,276	3,150	2,424	1,863	2,479	-797	-24%
Total	10,586	10,400	11,482	10,822	10,797	9,326	9,768	9,964	-858	-8%

¹ Formerly known as ArcelorMittal USA.

Chart 8: SO₂ Emissions for DRR-Identified Sources in Lake County



As outlined in Table 13 and Chart 8, averaged SO₂ emissions for 2018-2020 remained the same for Cokenergy, Cleveland-Cliffs Steel (316) decreased 3%, and U.S. Steel Gary Works decreased 24% from the 2013-2015 SO₂ emissions used in the modeling for designations. Averaged total emissions from the three DRR-identified sources for 2018-2020 decreased 858 tons, approximately 8% below what was modeled.

To determine if additional modeling is warranted, Indiana examined, as shown in Table 14, the SO₂ emissions from all sources included in the modeling for designations.

Table 14: SO₂ Emissions (tons) for the Lake County Area

Source Name	2013	2014	2015	Modeled 2013-2015 Average	2018	2019	2020	2018-2020 Average	Change	Percent Change
Cokenergy	4,653	4,952	6,104	5,236	5,398	4,840	5,470	5,236	0	0%
Cleveland-Cliffs Steel (316) ⁴	2,369	2,163	2,398	2,310	2,249	2,062	2,435	2,249	-61	-3%
U.S. Steel	3,564	3,285	2,980	3,276	3,150	2,424	1,863	2,479	-797	-24%
Safety Kleen	56	68	63	62	126	45	41	71	9	14%
Lafarge	129	113	127	123	166	141	160	156	33	27%
Eco Services	347	215	205	256	317	277	306	300	44	17%
Cleveland-Cliffs Steel (318) ³	1,638	1,587	1,067	1,431	1,512	1,531	724	1,256	-175	-12%
Cleveland-Cliffs Burns Harbor ⁵	13,864	12,189	12,202	12,752	11,452	11,415	10,714	11,194	-1,558	-12%
BP Products Whiting	----	----	400 ¹	400	291	252	279	274	-126	-32%
Ironside Energy	231	274	108	204	110	64	14	63	-141	-69%
Carmeuse Lime	----	----	----	263 ²	89	74	50	71	-192	-73%
Indiana Harbor Coke Co.	4,668	1,838	817	2,441	576	520	425	507	-1,934	-79%
Kopper, Inc.	1,096	870	669	878	222	244	309	258	-620	-71%
NIPSCO Bailly	2,474	1,117	515	1,369	53	0	0	18	-1,351	-99%
Total	35,089	28,671	27,655	31,001	25,711	23,889	22,790	24,130	-6,871	-22%

¹ Based on 2015 due to Whiting Refinery Modernization Project.

² Based on maximum allowable emissions taken from Commissioner's Order #2016—04.

³ Formerly known as ArcelorMittal Indiana Harbor.

⁴ Formerly known as ArcelorMittal USA.

⁵ Formerly known as ArcelorMittal Burns Harbor.

SO₂ emissions have decreased 22% throughout the Lake County area from what was modeled during the designation process. The increases, totaling 85 TPY, are more than offset by emissions decreases, totaling 6,956 TPY from remaining sources.

Analysis of Modeling

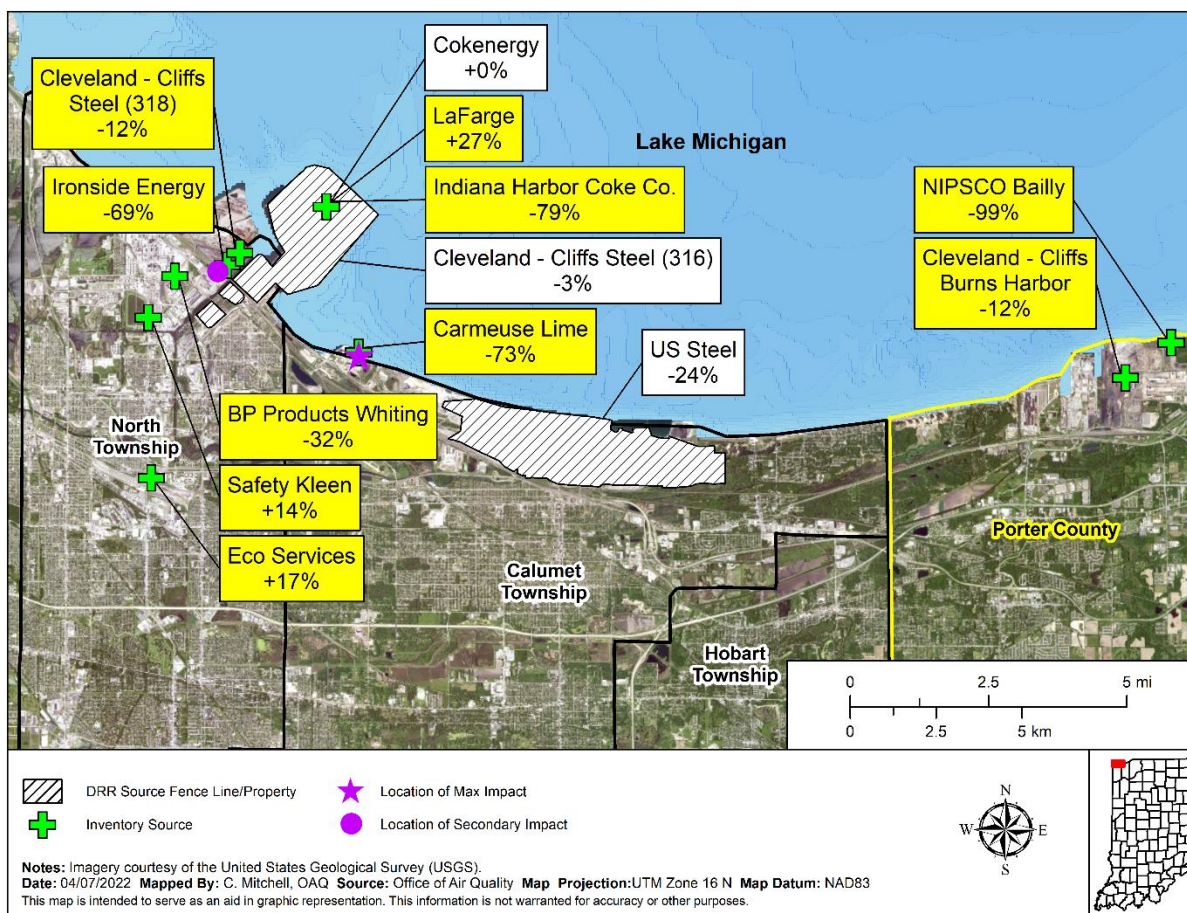
In addition, IDEM reviewed the modeling of Lake County used for designation purposes to determine the potential impact of the emissions changes.

Analysis of Maximum Impact

As shown in Figures 1 and 2, the location of the maximum impact used for the 1-hour SO₂ attainment designation for Lake County is located near the Carmeuse facility. The maximum modeled concentration was 192.2 micrograms per cubic meter (µg/m³).

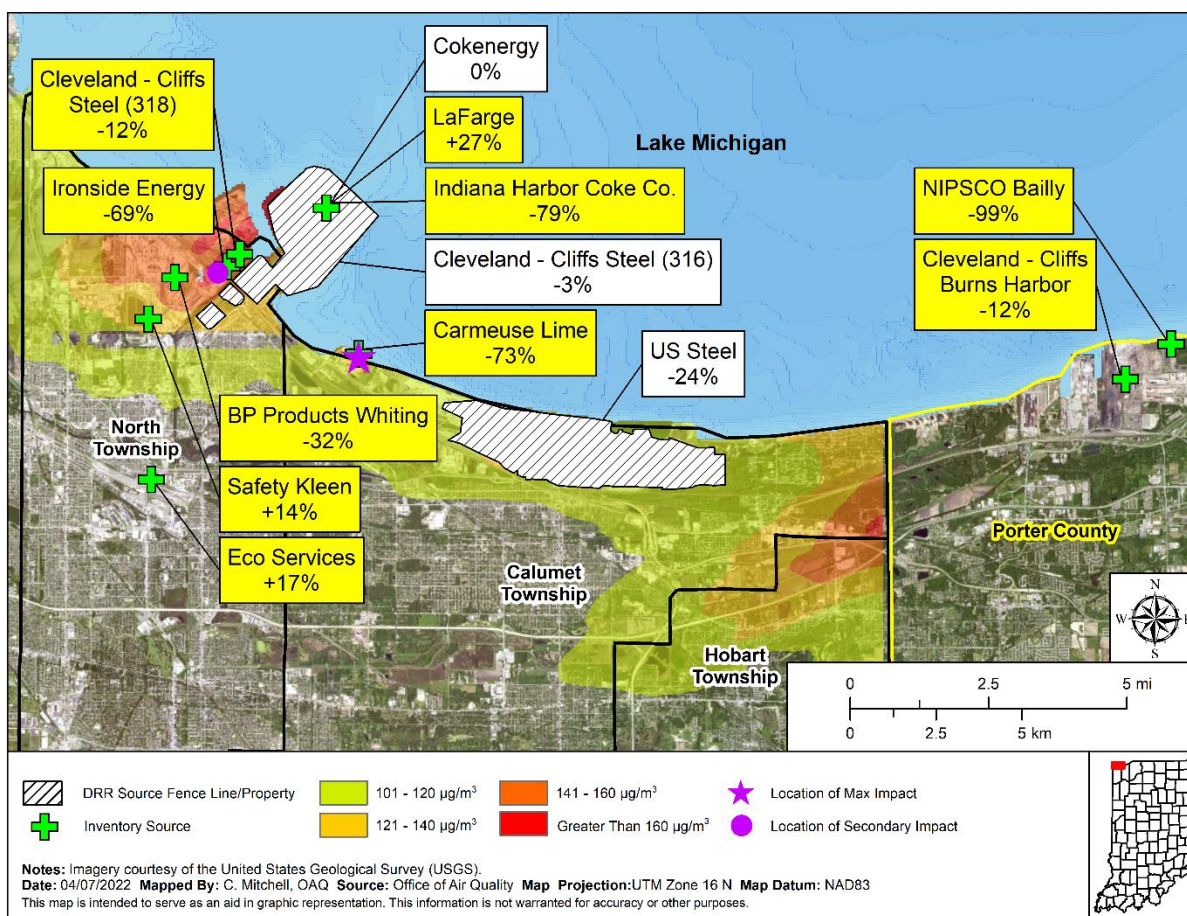
The Carmeuse Lime facility, although not an identified source under Round 3 designations, accepted permanent and enforceable SO₂ emissions limits to address SO₂ concentrations in the area and to demonstrate attainment of the 1-hr SO₂ NAAQS. It is unlikely that new modeling will show a higher impact given the significant emissions reductions in the region and at the Carmeuse facility which has reported actual SO₂ emissions well below the limits used to demonstrate attainment of the NAAQS.

Figure 1: Lake County Area SO₂ Sources and Percent Change in Emissions



In addition, assuming a simple, linear relationship in modeled impacts, and the percent change in emissions from each source in the area, the overall 22% decrease in emissions from all modeled sources in the Lake County area would show a decrease in projected SO₂ concentrations. Figure 2 shows the relationship of the modeled sources in Lake and Porter County to the 1-hour SO₂ modeled hot spots and how emission changes could influence the air quality impacts.

Figure 2: Lake County Area Sources and 1-Hour SO₂ Modeled Impact Areas.



Based on the complexity of characterizing air quality in Lake County, it is appropriate to assess emissions and cumulative projected modeled impacts from all modeled sources in the area.

Table 15 shows the modeled impacts on the maximum impact receptor, which was used for designation purposes. The results of this analysis show that if the maximum modeled impacts from each of the Lake County sources, using the 2013-2015 emissions, were added together, and compared to the projected modeled impacts incorporating 2018-2020 emissions changes, the resulting total modeled impacts would be less than modeled previously. While this approach is conservative in nature, as the maximum modeled impacts for each individual source do not occur on the same hour and day, it does show the reduction in overall projected maximum modeled impacts because of the emission change from each source and indicates that the 1-hour SO₂ NAAQS will not be exceeded.

Table 15: Projected Modeled Impacts at Maximum Modeled Location

Source	Maximum Modeled Impact from 2013-2015 Emissions	% Emissions Change 2013-2015 to 2018-2020	Projected Modeled Impact From 2018-2020 Emissions
Carmeuse Lime	156.3	-73%	42.2
Cleveland-Cliffs Steel (316) ²	53.1	-3%	51.5
Cokenergy	41.1	0%	41.1
U.S. Steel Gary Works	26.8	-24%	20.4
All other modeled sources	27.8	-29%	19.7
Background ¹	17.8		17.8
Total	322.9		192.7

¹ Background concentrations averaged from seasonal hourly Hammond data on day/hour of top 12 highest modeled values.

² Formerly known as ArcelorMittal USA.

Analysis of Secondary Impact

As shown in Figures 1 and 2, a secondary maximum modeled impact area was located northwest of the highest modeled impact area. This secondary impact had a modeled concentration of 182.8 µg/m³.

Table 16 shows the modeled impacts on the secondary maximum location for the area, as well as the projected modeled impacts when emission changes were considered. The results of this analysis show that if the maximum modeled impacts from each of the modeled Lake County area sources using the 2013-2015 emissions were added together and compared to the projected modeled impacts, that consider all emissions changes from 2013-2015 to 2018-2020, the resulting modeled concentrations are less, and will not violate the 1-hour SO₂ NAAQS. This approach is conservative in nature, as the maximum modeled impacts for each individual source do not occur on the same hour and day.

Table 16: Projected Modeled Impacts at Secondary Maximum Modeled Location

Sources	Maximum Modeled Impact from 2013-2015 Emissions	% Emissions Change 2013-2015 to 2018-2020	Projected Modeled Impact from 2018-2020 Emissions
Carmeuse Lime	11.9	-73%	3.2
Cleveland-Cliffs Steel (316) ²	78.3	-3%	76.0
Cokenergy	54.6	0%	54.6
U.S. Steel Gary Works	17.5	-24%	13.3
All other modeled sources	106.1	-29%	75.3
Background ¹	17.8		17.8
Total	286.2		240.2

¹ Background concentrations averaged from seasonal hourly Hammond data on day/hour of top 12 highest modeled values.

² Formerly known as ArcelorMittal USA.

Also, it is worth noting that certified ambient air quality monitoring data from Lake County continues to improve and demonstrates attainment of the 2010 primary 1-hour SO₂ standard. Design values at both SO₂ sites within the county for the 2019-2021 period have decreased from 2013-2015. The Gary-IITRI monitoring site has decreased from 44 ppb to 33 ppb and the Hammond-141st St. monitor has decreased from 23 ppb to 22 ppb.

Based on this assessment, Indiana recommends that additional modeling is not needed to further characterize air quality in Lake County. The area is currently designated as “attainment/unclassifiable” and no changes to their classification are necessary at this time.

Round 4 Areas

During Round 4 designations, one source in Indiana, shown in Table 17, was identified around which SO₂ air quality characterization was required.

Table 17: Sources Subject to the Round 4 Designation Process

County	Source
Porter	Cleveland-Cliffs Burns Harbor ¹

¹ Formerly known as ArcelorMittal Burns Harbor.

On December 21, 2020, U.S. EPA completed designations for Round 4 designating Porter County, as “attainment/unclassifiable”. The final rule was published in the Federal Register on March 26, 2021, and became effective on April 30, 2021 (86 FR 16055).

Monitoring data was used to characterize air quality for designation of Porter County. Ongoing data requirements are the continued operation of SO₂ monitors as well as the continued reporting of such data. Cleveland-Cliffs Burns Harbor continues to operate its Indiana Port SO₂ monitoring station located west of the facility. Data is reported to U.S. EPA's Air Quality System (AQS) database. The Dunes Acre Substation SO₂ monitor was discontinued in 2020 due to monitored SO₂ values below 50% of the 1-hour SO₂ NAAQS.

Monitoring data for the years 2018-2021, as shown in Table 18, show a three-year average design value at the Indiana Port monitor above the 1-hour SO₂ NAAQS. An analysis of the violation is discussed below.

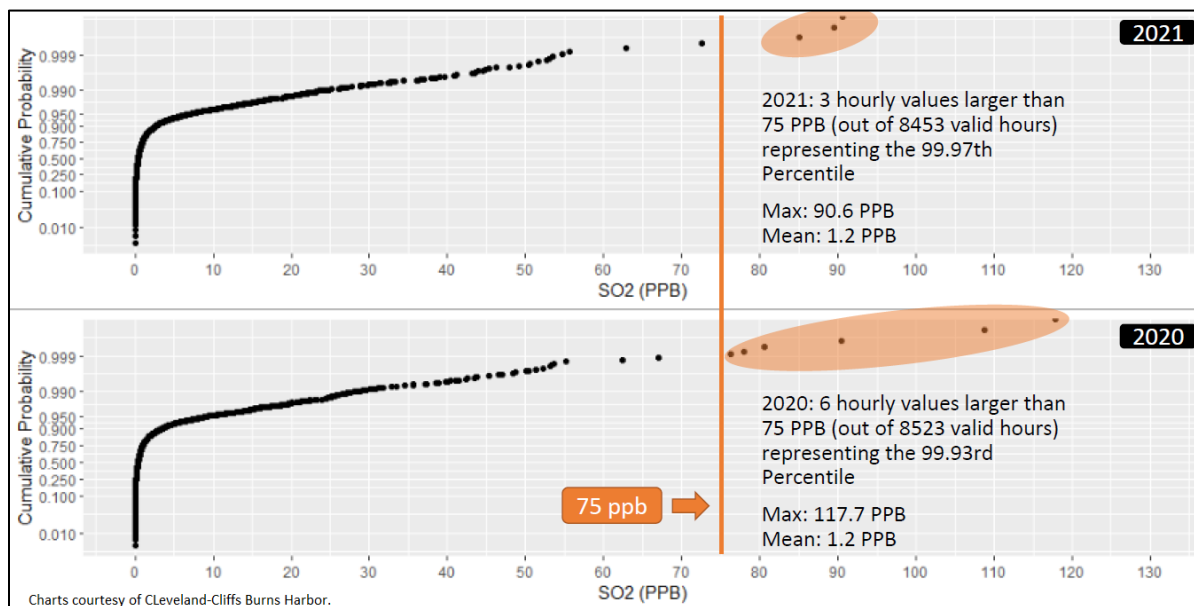
Table 18: Indiana Port (Cleveland-Cliffs Burns Harbor) SO₂ Monitoring Data

Site ID	County	99th Percentile Values, ppb				3-Year Design Value, ppb	
		2018	2019	2020	2021	2018-2020	2019-2021
181270028	Porter	27.9	78.8	80.5	72.5	62	77

Elevated ambient SO₂ levels began in 2019 and 2020. Cleveland-Cliffs acquired the Burns Harbor facility from ArcelorMittal on December 23, 2020, and immediately re-evaluated the coal blend used at the facility's coke plant. In January 2021, Cleveland-Cliffs initiated the purchasing of metallurgical coal blends with a lower sulfur content in order to reduce SO₂ emissions emitted from the facility's boilers and stoves. This resulted in approximately a 10% decrease in the annual 99th percentile SO₂ concentration at the Indiana Port monitor from 2020 to 2021.

Further analysis of the SO₂ data from 2020 and 2021 is presented in Chart 9. As shown, due to the mitigation measures implemented at the Cleveland-Cliffs Burns Harbor facility, the maximum SO₂ values decreased from 117.7 to 90.6 ppb and the total number of values above the SO₂ NAAQS was reduced by 50%. This indicates that the use of low sulfur metallurgical coal will continue to sustain decreased ambient SO₂ concentrations at the Indiana Port monitor in 2022.

Chart 9: Indiana Port Monitor Hourly SO₂ Concentrations (ppb)



In addition, since the inputs to the calculation of a design value are the 4th highest daily maximum 1-hour values, intermittent operations that cause short-term spikes in the SO₂ concentration at the monitor can significantly increase the design value. For instance, as shown in Table 20, for each of the years 2019, 2020, and 2021, one of the four highest 1-hour SO₂ concentrations occurred when a ship was unloading at the Indiana Port. When ships unload at the Indiana Port, their exhaust stack is the closest source of SO₂ emissions to the Indiana Port monitor. Measures to reduce SO₂ emissions from ships unloading at the Indiana Port could increase the margin of safety for attaining the NAAQS. In fact, if SO₂ emissions during ship unloading at the Indiana Port shown in Table 20 were mitigated enough to remove them from the four highest daily maximum 1-hour values, the Indiana Port monitor would show attainment of the SO₂ NAAQS. Cleveland-Cliffs Burns Harbor will continue to note and assess these occurrences.

Table 20: Indiana Port Monitor Fourth High Values Occurring During Ship Unloading (ppb)

SO ₂ Ambient Concentration Rank	Year	SO ₂ Concentration (ppb)	Date	Ship Docked?
3 rd High	2019	81.0	September 19	Yes
4 th High	2020	80.5	May 12	Yes
2 nd High	2021	89.5	June 1	Yes

Public Participation

IDEM is providing a 30-day public comment period concerning this submittal of the *2022 Ongoing Data Requirements for the 2010 Primary 1-Hour Sulfur Dioxide National Ambient Air Quality Standard*. Please refer to the Supporting Document for further information and dates regarding the public participation process.

A copy of this report was sent to U.S. EPA Region 5 through the State Planning Electronic Collaboration System (SPeCS).

If you have any questions or need additional information, please contact Brian Callahan, Chief, Air Quality Standards and Implementation Section, Office of Air Quality at (317) 232-8244 or bcallaha@idem.IN.gov.

Sincerely,

Matt Stuckey
Assistant Commissioner
Office of Air Quality

MS/sd/bc/md/gf/lf

Supporting Document:

1. Public Participation Process Documentation

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Brian Callahan, IDEM (no enclosure)
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Supporting Document

Public Participation Process Documentation

to be added

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